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Group Decisions: How (Not) to Choose a Restaurant with Friends

Subordinate baboons voluntarily follow the dominant group member to foraging patches where they themselves starve. One-sided preservation of social ties seems to prevail over fair decision sharing, contradicting recent theory.

Larissa Conradt

As humans, we are used to making decisions not as individuals acting alone, but collectively and interactively, as a group. It is obvious that our sophisticated societies could not persist without collective decision making, whether this be choosing a restaurant with a group of friends, electing a political leader, or deciding on international actions to tackle climate change or financial meltdown. Because our ability to make decisions collectively dictates not only the nature and quality of specific decision outcomes, but also the stability of society itself, it is not surprising that collective decision making has been a central topic of philosophy and the social sciences for millennia (for example, see Plato's *The Republic* written in 360 BC).

What might be less obvious is that collective decisions are just as important for other social animals as they are for humans. Dispersing swarms of bees and ants collectively choose new nest sites on which depend their survival and future reproduction. Homing and migrating birds collectively decide on communal routes that affect their chances of arriving successfully. Bats collectively select roosting sites that are crucial for survival and breeding. Swarms of insects,

shoals of fish, flocks of birds, groups of carnivores, herds of ungulates and troops of primates collectively decide on the direction of group movements and the timing of group activities, with important fitness consequences to all group members. Cooperative species, such as eusocial insects and communal breeders, collectively decide job allocation in crucial communal enterprises, such as supplying food to the hive, rearing young, defending the group against predators, and hunting prey. There are many more examples.

While the study of collective decision-making in social animals is still relatively young, it is now expanding rapidly [1] and has been a central theme at several recent international conferences. However, with perhaps the exception of empirical studies on insects [2–5], theoretical developments [6–10] have, so far, advanced far ahead of empirical evidence. The recent *Current Biology* paper by King et al. [11] is a welcome step towards closing this gap. The study is remarkable in three respects. Firstly, the work was done on wild primates (Figure 1), rather than on captive or semi-free ranging ones. Secondly, the work is experimental, rather than merely observational, in character. Thirdly, and most importantly, the study

measures one of the main factors considered crucial in collective decision making from a theoretical point of view, namely, the 'consensus costs'. These are the costs, to individual group members, of reaching a consensus [1,8]. To the best of my knowledge, this is a first.

King et al. [11] presented two wild baboon groups with experimental food patches within their home ranges, additionally to natural patches. In experimental patches, food intake amongst group members was highly skewed in such a way that a minority of (dominant) group members had a very high food intake, while the remaining majority of (subordinate) group members had hardly any food intake at all. In contrast, in natural patches, food intake was relatively evenly spread across group members. Thus, if the group chose an experimental over a natural foraging patch, the majority of group members would incur substantial consensus costs in terms of reduced food intake. On the other hand, if the group chose a natural over an experimental patch, a minority of dominant members would incur consensus costs. Theory predicts that, under such circumstances, groups should move to the patch that benefits the majority of group members, and, thus, minimises overall consensus costs [6–9]. That is, the group should choose a natural patch. What King et al. [11] observed was exactly the opposite. Both baboon groups consistently visited experimental patches in preference to natural patches. Coercion by dominant individuals did not play a role in this choice.



Figure 1. Baboons grooming.
Photo credit: Tsaobis Baboon Project/ZSL.

This is puzzling because it contradicts almost all recent theoretical models, which predict that collective decisions should be shared fairly equally between group members, and that consensus should often be reached in favour of majority preferences. For example, majority decisions are predicted to be more accurate than decisions led by a dominant individual [1,6,8,10,12] and to increase group stability [8]; and selection is predicted to favour equally shared decisions, over dominant decisions, under a wide variety of conditions [7–9]. To explain the discrepancy between theory and observation, King *et al.* [11] suggest that preserving social ties is more important for subordinates than it is for dominants, so the majority of group members follow the dominant despite significant foraging disadvantages. Modellers have so far little considered this kind of difference between group members with respect to the importance of social ties. The present study suggests that this is an omission that requires correction.

Another potential explanation could lie in the fact that many group decision models relate to decisions about the timing of activities (for example [7–9]), rather than to decisions about patch choice, and

that these two types of decision could differ in principle [1]. In particular, compromises between the preferences of individual group members might make sense with respect to collective timing decisions but not with respect to decisions about where to go. For example, if my friend prefers to go to a restaurant at 7pm, whereas I would prefer 9pm, we might both happily agree to go at 8pm. By contrast, if my friend prefers to go to an Indian restaurant in the North of town, whereas I would prefer an Italian restaurant in the East, there would not be much point in us going to the North-East of town where there might be no restaurant at all. This *a priori* difference between the two types of collective decision could lead to different predictions about decision sharing [1], in which case published theoretical models might not be applicable to the empirical situation examined by King *et al.* [11]. Clearly, theorists need to explore in greater detail the potential differences between different types of collective decision.

One weakness of the paper by King *et al.* [11] is the small sample size. However, this is an intrinsic problem for studies on group decision-making, especially when the subjects are higher vertebrates. The unit of analysis in group decision-making

studies has to be the group, and groups have to be of reasonable size. Consequently, a rather large number of individuals is usually required to achieve even a modest sample size in terms of number of groups. This poses a problem even for purely theoretical studies (for example [7,9]), and is probably the main reason why empirical studies are so biased towards insects. If we want to learn anything about vertebrate group decision making, we will probably have to be content with relatively small sample sizes for the foreseeable future.

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